

## CORRESPONDENCE

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## Are Only Large Doses of Rocuronium an Alternative to Succinylcholine for Rapid-sequence Induction?

*To the Editor:*—Magorian *et al.*<sup>1</sup> recently investigated onset times and intubating conditions with three doses (0.6, 0.9, and 1.2 mg · kg<sup>-1</sup>) of rocuronium, 0.1 mg · kg<sup>-1</sup> vecuronium, and 1 mg · kg<sup>-1</sup> succinylcholine. No significant difference could be demonstrated between succinylcholine and the two larger doses of rocuronium either in onset time or in intubating conditions at 60 s. This led the authors to conclude that rocuronium 0.9 and 1.2 mg · kg<sup>-1</sup> might be an alternative to succinylcholine for rapid-sequence induction. This conclusion is based on the assumption that the twitch response of the adductor pollicis muscle is a "quantifiable and reliable endpoint" defining optimal intubating conditions, whereas intubating scores are a qualitative and rather subjective measure of intubating conditions. This conclusion does not adequately account for the observation that all patients who received 0.6 mg · kg<sup>-1</sup> rocuronium in this study showed excellent intubating conditions. Findings similar to these have been reported for the same dose of rocuronium in larger numbers of patients, 65–97% of whom had excellent intubating conditions irrespective to the onset time.<sup>2–4</sup>

We question the reliability of onset time in predicting optimal intubating conditions, on the following grounds. (1) Onset time is significantly influenced by the stimulation mode<sup>5</sup> and possibly also by the speed of injection, which seldomly is standardized in clinical studies. (2) Relaxation of the masseter, intrinsic laryngeal muscles, or diaphragm and the depth of anesthesia are more likely to determine intubating conditions than is the block of the adductor pollicis muscle. (3) The predictive value of the onset time appears to be questionable also with other agents. With mivacurium 0.15 and 0.2 mg · kg<sup>-1</sup>, intubating conditions at 2 min (despite complete peripheral block) have been found to be unacceptable in 100 and 35% of patients, respectively.<sup>6</sup>

We also think that the number of patients in this study was too small to demonstrate the existing differences at significant levels among the various groups. This limitation is illustrated by the similarity in intubating conditions at 60 s even between the vecuronium and succinylcholine groups. That the anesthetic regimen is not de-

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scribed entirely clearly makes it difficult to interpret the findings. The use of fentanyl as a premedicant was mentioned in the abstract, but the dose was not specified.

Last but not least, to make recommendations for dosing for rapid-sequence induction based on this study may not be appropriate because 5–10 min elapsed between induction of anesthesia and intubation, which was attempted 60 s after administration of a relaxant. Therefore, "rapid-sequence intubation" would better describe the experimental conditions in this study.

In our opinion, the effect of onset time in relation to intubating conditions should be reconsidered. Studies in a large series of elective patients can give guidance. Only after large numbers of patients have been treated by a variety of anesthesiologists in actual emergency situations will it be possible to define recommended doses for rapid-sequence induction.

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*In Reply:*—We appreciate the interest in our article<sup>1</sup> expressed by Sparr and Mitterschiffthaler. Although we presented data for both onset time and intubating conditions, we believe the former to be more valuable.

Sparr and Mitterschiffthaler question this emphasis on onset time, noting the poor reliability of onset time in predicting optimal intubating conditions. We combined the objective measure of onset time with the subjective evaluation of tracheal "intubating conditions" to provide predictive information for the clinician.

Sparr and Mitterschiffthaler emphasize variables associated with onset times. We submit, however, that "intubating conditions" have many more variables and thus that the ability to evaluate the contributions of the muscle relaxant to intubating conditions is extremely difficult; some groups have found adequate intubating conditions without any muscle relaxant at all.<sup>2-4</sup>

We are pleased that Sparr and Mitterschiffthaler recognize the need to base ultimate recommendations on the experience of many clinicians in numerous clinical situations, as ultimately will occur with rocuronium. However, the poor correlation observed in the studies they cite does not invalidate the use of twitch response for assessment, but instead reflects the multiple irrelevant factors that affect subjective assessment of intubating conditions. In short: although intubating conditions may be the most clinically relevant variable, the methods available for assessment are too inaccurate and unreliable to generate very meaningful data.

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